

What is claimed is:

1 1. A method for analyzing an integrated circuit die having a silicon on insulator
 2 (SOI) structure, the method comprising;
 3 directing a modulated optical beam at a selected portion of the SOI structure, the
 4 modulation being sufficient to inhibit optical beam intrusion upon the integrated circuit;
 5 and
 6 obtaining a reflected optical waveform response from the SOI structure selected
 7 portion.

1 2. A method for analyzing an integrated circuit die having SOI structure, according
 2 to claim 1, wherein directing a modulated optical beam includes directing an infrared
 3 laser beam.

1 3. A method for analyzing an integrated circuit die having SOI structure, according
 2 to claim 2, wherein directing a laser beam includes pulsing the laser beam for a femto-
 3 second range duration.

1 4. A method for analyzing an integrated circuit die having SOI structure, according
 2 to claim 1, further comprising operating the die prior to obtaining a reflected optical
 3 waveform response.

1 5. A method for analyzing an integrated circuit die having SOI structure, according
2 to claim 1, wherein directing a modulated optical beam includes sufficiently modulating
3 the beam to eliminate optical beam intrusion upon the integrated circuit.

1 6. A method for analyzing an integrated circuit die having SOI structure, according
2 to claim 1, wherein directing a modulated optical beam includes directing the beam at a
3 backside of the die.

1 7. A method for analyzing an integrated circuit die having SOI structure, according
2 to claim 1, wherein obtaining a reflected response includes obtaining a voltage waveform
3 and using the voltage waveform to analyze the die.

1 8. A method for analyzing an integrated circuit die having SOI structure, according
2 to claim 7, wherein using the voltage waveform to analyze the die includes comparing the
3 waveform to a reference waveform from a defective integrated circuit die and detecting a
4 condition of the die therefrom.

1 9. A method for analyzing an integrated circuit die having SOI structure, according
2 to claim 7, wherein using the voltage waveform to analyze the die includes comparing the
3 waveform to a reference waveform from a non-defective integrated circuit die and
4 detecting a condition of the die therefrom.

1 10. A method for analyzing an integrated circuit having SOI structure, according to
2 claim 1, wherein directing the modulated optical beam includes focusing the beam at a
3 selected depth within the selected portion of the SOI structure.

1 11. A method for analyzing an integrated circuit having SOI structure, according to
2 claim 1, further comprising thinning a backside of the integrated circuit having SOI
3 structure prior to directing the modulated optical beam thereto.

1 12. An arrangement for analyzing an integrated circuit having a silicon on insulator
2 (SOI) structure, the arrangement comprising;
3 means for directing a modulated optical beam at a selected portion of the SOI
4 structure, the modulation being adapted to inhibit optical beam intrusion upon the
5 integrated circuit; and
6 means for obtaining a reflected optical waveform response from the SOI selected
7 portion.

1 13. A system for analyzing an integrated circuit having a silicon on insulator (SOI)
2 structure, the system comprising;
3 an optical beam arrangement adapted to direct a modulated optical beam at a
4 selected portion of the SOI structure and to inhibit intrusion of the optical beam upon the
5 integrated circuit via the modulation; and
6 a detection arrangement adapted to detect a reflected optical waveform response
7 from the SOI structure selected portion.

1 14. The system for analyzing an integrated circuit having a silicon on insulator (SOI)
2 structure of claim 13, wherein the optical beam arrangement includes an infrared laser.

1 15. The system for analyzing an integrated circuit having a silicon on insulator (SOI)
2 structure of claim 14, wherein the optical beam arrangement is adapted to pulse the laser
3 at femto-second-range pulses.

1 16. The system for analyzing an integrated circuit having a silicon on insulator (SOI)
2 structure of claim 14, further comprising a testing device adapted to operate the die.

1 17. The system for analyzing an integrated circuit having a silicon on insulator (SOI)
2 structure of claim 13, further comprising a computer arrangement coupled to the detector
3 arrangement and adapted to receive and process the reflected optical waveform response.

1 18. The system for analyzing an integrated circuit having a silicon on insulator (SOI)
2 structure of claim 17, further comprising a visual output arrangement coupled to the
3 computer arrangement and adapted to present data from the computer arrangement for
4 visual analysis.

1 19. The system for analyzing an integrated circuit having a silicon on insulator (SOI)
2 structure of claim 18, wherein the visual output arrangement includes at least one of: a
3 video monitor and a printer.

- 1 20. The system for analyzing an integrated circuit having a silicon on insulator (SOI)
- 2 structure of claim 19, wherein the computer arrangement includes waveform analysis
- 3 software.